C# and .NET Frameworks

Assignment 1

1.Develop the C# program to initialize two dimensional array and print all the elements of the array on the same line separated with space.

AIM:

To initialize and print a 2D array containing numbers 1 to 9.

```
using System;
class Program
  static void Main()
  {
     int[,] array = {
       \{2,3,4\},
       { 5, 6,7 },
       { 8, 9, 1}
     };
    for (int i = 0; i < array.GetLength(0); i++)
     {
       for (int j = 0; j < array.GetLength(1); j++)
       {
          Console.Write(array[i, j] + " ");
```

```
}
Console.WriteLine();
}
```



OUTPUT:

234567891

- 2. Aravind wants to apply for competitive exam. He needs to know whether he is eligible to apply. The eligibility criteria is given below:
- Age should be greater than 18 years, but not more than 30.
- The candidate should have passed 10 std with a minimum pass percentage of 65.

Design the C# program to help him to know his eligibility. If the criteria gets satisfied, print he is eligible else print he is not eligible.

AIM:

To determine and print whether a person named Aravind is eligible to apply for a competitive exam based on their age and 10th standard pass percentage.

```
class Program
{
    static void Main()
    {
        Console.WriteLine("Enter your age: ");
        int age = int.Parse(Console.ReadLine());

        Console.WriteLine("Enter your 10th standard pass percentage: ");
        double passPercentage = double.Parse(Console.ReadLine());

        if (age > 18 && age <= 30 && passPercentage >= 65)
        {
            Console.WriteLine("You are eligible to apply for the competitive exam.");
        }
}
```

```
else
              Console.WriteLine("You are not eligible to apply for the competitive
exam.");
                                                          Obtain Curação Gaming License - Register a...
     Programiz
                                                                                                               LEARN MORE
                                                          SPONSORED BY GBO-LICENSING.COM/-GAMING LICENSE/CURACAO
     C# Online Compiler
       Main.cs
                                                           Share Run
        1 using System;
                                                                                             mono /tmp/U81j1bw3Ni.exe
R
                                                                                            Enter your age:
          class Program
Enter your 10th standard pass percentage:
     4 - {
               static void Main()
                                                                                            You are eligible to apply for the competitive exam.
5
                    Console.WriteLine("Enter your age: ");
                 int age = int.Parse(Console.ReadLine());
                                                                                            === Code Execution Successful ===
 $
                  Console.WriteLine("Enter your 10th standard pass percentage: ");
double passPercentage = double.Parse(Console.ReadLine());
(
(
                  if (age > 18 && age <= 30 && passPercentage >= 65)
                       Console.WriteLine("You are eligible to apply for the competitive
                   else
                       {\bf Console.WriteLine} (\hbox{"You are not eligible to apply for the} \\
                           competitive exam.");
```

Enter your age:20

Enter your 10th standard pass percentage:90

OUTPUT:

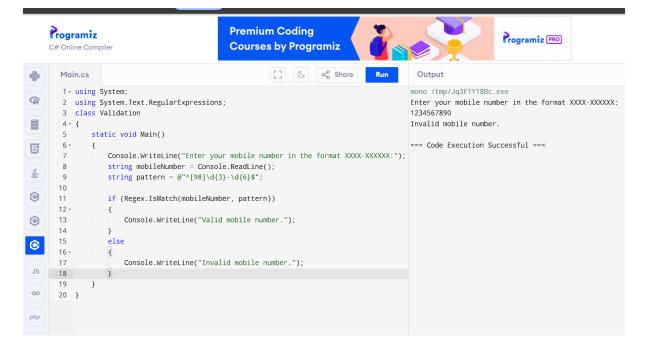
You are eligible to apply for the competitive exam.

- 3.Design the C# console application named validation to get mobile number as input from the user. Validate the mobile number with the following cases:
- The first four number must be followed by then followed by next six numbers(eg:9894-256874).
- Should contains only numbers.
- Should be of length 10.
- The first number should start only with 9 Or 8.

AIM:

```
To validate and print whether a given mobile number is valid or not.
PROGRAM:
using System;
using System.Text.RegularExpressions;
class Validation
  static void Main()
  {
    Console.WriteLine("Enter your mobile number in the format XXXX-
XXXXXX:");
    string mobileNumber = Console.ReadLine();
    string pattern = @''^[98]\d{3}-\d{6}$";
    if (Regex.IsMatch(mobileNumber, pattern))
       Console.WriteLine("Valid mobile number.");
    }
```

```
else
{
    Console.WriteLine("Invalid mobile number.");
}
}
```



1234567890

OUTPUT:

Invalid mobile number.

4. Write the missing code snippets and the statements in the C# program given below.

Class person {
name;
age;
weight;
Void printperson() {

```
// write the code to print name, age and weight of a person
}
Class persondata {
Static void Main(string[] args) {
person____ = ____;
.name = "Kannan";
_____.age = 19;
 .weight = 58;
// write the statement to access printperson() function
}
}
AIM:
   To create a Person class, instantiate it, and print out the person's name, age,
and weight using a method.
PROGRAM:
using System;
class Person
  public string name;
  public int age;
  public double weight;
  public void PrintPerson()
    Console.WriteLine("Name: " + name);
    Console.WriteLine("Age: " + age);
    Console.WriteLine("Weight: " + weight);
  }
```

```
}
class PersonData
    static void Main(string[] args)
         Person person1 = new Person();
         person1.name = "Santhiya";
        person1.age = 20;
        person1.weight = 56;
        person1.PrintPerson();
    Programiz
                                                    On Any Device & OS - IDBI Bank Star Salary Ac...
                                                                                                  LEARN MORE
                                                    SPONSORED BY WWW.SIGNNOW.COM
                                                    [] G & Share Run
      Main.cs
       1 using System;
                                                                                  mono /tmp/zLOWOmphDp.exe
R
         class Person
                                                                                  Name: Santhiya
                                                                                  Age: 20
             public string name;
Weight: 56
             public int age;
             public double weight;
public void PrintPerson()
                                                                                  === Code Execution Successful ===
9
É
             Console.WriteLine("Name: " + name);
Console.WriteLine("Age: " + age);
Console.WriteLine("Weight: " + weight);
(
©
      14 class PersonData
15 - {
©
             static void Main(string[] args)
```

OUTPUT:

Name:Santhiya

Person person1 = new Person();
person1.name = "Santhiya";
person1.age = 20;

person1.weight = 56; person1.PrintPerson();

Age:20

Weight:56

- 5. A hospital wants to create a console application to maintain its impatient details. The information to store includes:
- Name of the patient
- Date of admission
- Age of patient
- Disease
- Date of discharge
- Total bills paid

Design the C# program with the class name patient with necessary data members to store the above information. The class should have two member functions, one to get the patients information and other to display the information. Create a main class called hospital to create necessary instances, methods calling statements and display all the details about the patient.

AIM:

To create a Patient class, collect patient information through user input, and display the collected information using methods.

```
using System;

class Patient
{

public string Name;

public string DateOfAdmission;

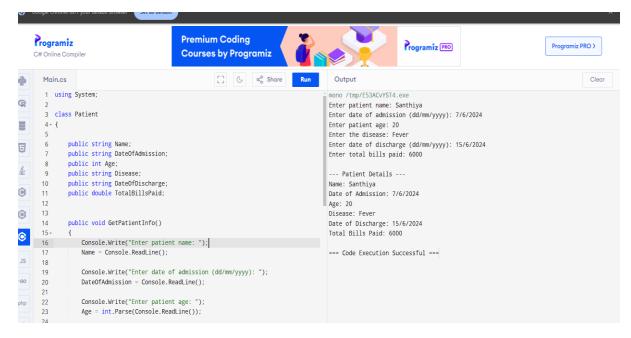
public int Age;

public string Disease;

public string DateOfDischarge;
```

```
public double TotalBillsPaid;
public void GetPatientInfo()
  Console.Write("Enter patient name: ");
  Name = Console.ReadLine();
  Console.Write("Enter date of admission (dd/mm/yyyy): ");
  DateOfAdmission = Console.ReadLine();
  Console.Write("Enter patient age: ");
  Age = int.Parse(Console.ReadLine());
  Console.Write("Enter the disease: ");
  Disease = Console.ReadLine();
  Console.Write("Enter date of discharge (dd/mm/yyyy): ");
  DateOfDischarge = Console.ReadLine();
  Console.Write("Enter total bills paid: ");
  TotalBillsPaid = double.Parse(Console.ReadLine());
}
public void DisplayPatientInfo()
{
```

```
Console.WriteLine("\n--- Patient Details ---");
    Console.WriteLine($"Name: {Name}");
    Console.WriteLine($"Date of Admission: {DateOfAdmission}");
    Console.WriteLine($"Age: {Age}");
    Console.WriteLine($"Disease: {Disease}");
    Console.WriteLine($"Date of Discharge: {DateOfDischarge}");
    Console.WriteLine($"Total Bills Paid: {TotalBillsPaid}");
  }
}
class Hospital
{
  static void Main(string[] args)
  {
    Patient patient1 = new Patient();
    patient1.GetPatientInfo();
    patient1.DisplayPatientInfo();
}
```



Enter patient name: Santhiya

Enter date of admission (dd/mm/yyyy): 7/6/2024

Enter patient age: 20

Enter the disease: Fever

Enter date of discharge (dd/mm/yyyy): 15/6/2024

Enter total bills paid: 6000

OUTPUT:

Name: Santhiya

Date of Admission: 7/6/2024

Age: 20

Disease: Fever

Date of Discharge: 15/6/2024

Total Bills Paid: 6000

6. Implement the C# code to get two vector number as input, add them and print the sum as another vector. Make use of operator overloading to perform addition of vector numbers.

AIM:

To create a Vector class, overload the '+' operator to add two vectors, and demonstrate vector addition by taking user input for two vectors and displaying their sum.

```
using System;
class Vector
  public int X { get; set; }
  public int Y { get; set; }
    public Vector(int x, int y)
  {
    X = x;
    Y = y;
  }
  public static Vector operator +(Vector v1, Vector v2)
  {
    return new Vector(v1.X + v2.X, v1.Y + v2.Y);
  }
    public void Display()
     Console. WriteLine($"Vector: ({X}, {Y})");
```

```
}
class Program
  static void Main(string[] args)
  {
     Console.WriteLine("Enter the components of the first vector:");
     Console.Write("X1: ");
     int x1 = int.Parse(Console.ReadLine());
     Console.Write("Y1: ");
     int y1 = int.Parse(Console.ReadLine());
     Console. WriteLine("Enter the components of the second vector:");
     Console.Write("X2: ");
     int x2 = int.Parse(Console.ReadLine());
     Console.Write("Y2: ");
     int y2 = int.Parse(Console.ReadLine());
     Vector v1 = new Vector(x1, y1);
     Vector v2 = new Vector(x2, y2);
     Vector result = v1 + v2;
```

Console.WriteLine("The sum of the two vectors is:"); result.Display();



INPUT:

Enter the components of the first vector:

X1: 2

Y1: 3

Enter the components of the second vector:

X2: 4

Y2: 5

OUTPUT:

The sum of the two vectors is:

Vector: (6, 8)

7. Create the class student with necessary members to maintain the basic details of a student such as name, age, address and mobile number. Add method getDate() to read the basic details and printData() to print the details of the student. Inherit the student class into the sub class called studentmark with necessary members to maintain student mark details. Override the getData() and printData() in student mark class to read mark details and print the marks, respectively. Also, define a method to find the grade of the student based on his/her marks. Design the student main class to access the member of both the classes in C#.

AIM:

To create a Student class and a derived StudentMark class, which inherits and extends the base class to include mark details, calculates grades based on marks, and demonstrates polymorphism through overridden methods.

```
using System;

class Student
{
    public string Name { get; set; }
    public int Age { get; set; }
    public string Address { get; set; }
    public string MobileNumber { get; set; }

    public virtual void GetData()
    {
        Console.Write("Enter student's name: ");
        Name = Console.ReadLine();

        Console.Write("Enter student's age: ");
        Age = int.Parse(Console.ReadLine());
}
```

```
Console.Write("Enter student's address: ");
    Address = Console.ReadLine();
    Console.Write("Enter student's mobile number: ");
    MobileNumber = Console.ReadLine();
  }
  public virtual void PrintData()
    Console.WriteLine("\n--- Student Details ---");
    Console.WriteLine($"Name: {Name}");
    Console.WriteLine($"Age: {Age}");
    Console.WriteLine($"Address: {Address}");
    Console.WriteLine($"Mobile Number: {MobileNumber}");
class StudentMark: Student
    public int Marks { get; set; }
    public override void GetData()
  {
    base.GetData();
```

}

{

```
Console.Write("Enter student's marks: ");
  Marks = int.Parse(Console.ReadLine());
}
public override void PrintData()
{
  // Call the base class method to print basic details
  base.PrintData();
  Console.WriteLine($"Marks: {Marks}");
  Console.WriteLine($"Grade: {CalculateGrade()}");
}
public string CalculateGrade()
  if (Marks \geq 90)
     return "A";
  else if (Marks \geq = 75)
     return "B";
  else if (Marks \geq = 50)
     return "C";
  else
     return "F";
```

}

```
class StudentMain
    static void Main(string[] args)
          StudentMark student = new StudentMark();
          student.GetData();
          student.PrintData();
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                                                                                                        Programiz PRO
                                                                                                                                                Programiz PRO >
                                             Courses by Programiz
                                                      [] G & Share
      Main.cs
       1 using System;
                                                                                       no /tmp/vjJwA7SzWr.exe
œ
                                                                                    Enter student's name: Divya
Enter student's age: 23
       3 class Student
Enter student's address: Anna Nagar
Enter student's mobile number: 9145346789
             public string Name { get; set; }
                                                                                    Enter student's marks: 95
5
             public int Age { get; set; }
public string Address { get; set; }
public string MobileNumber { get; set; }
                                                                                    --- Student Details ---
£
10
                                                                                    Name: Divva
                                                                                    Age: 23
              public virtual void GetData()
                                                                                    Address: Anna Nagar
                                                                                    Mobile Number: 9145346789
                Console.Write("Enter student's name: ");
13
                                                                                    Marks: 95S
                Name = Console.ReadLine();
©
              Console.Write("Enter student's age: ");
                                                                                    === Code Execution Successful ===
                Age = int.Parse(Console.ReadLine());
                Console.Write("Enter student's address: ");
                Address = Console.ReadLine();
                 Console.Write("Enter student's mobile number: ");
                 MobileNumber = Console.ReadLine():
```

Enter student's name: Divya

Enter student's age: 23

Enter student's address: Anna Nagar

Enter student's mobile number: 9145346789

Enter student's marks: 95

OUTPUT:

Name: Divya

Age: 23

Address: Anna Nagar

Mobile Number: 9145346789

Marks: 95

Grade: A

8. Design sample C# program with class name employee to compute netsalary of the employee using the basic salary, if for the job_catg is 1 use table-I else use table-II. Use constructor to initialize basic salary,hra,da,pf and loan. The employee class should contain input() method to get input for job_catg, empno, empname, calculateSalary() method to compute salary and display() method to print the details.

Table-I	Table-II
BASIC=Rs. 8,000	BASIC=Rs. 15,000
HRA=10% of basic DA=20% of basic LOAN=Rs. 300	HRA=20% of basic DA=30% of basic LOAN=Rs. 600 PF=1000
PF=Rs. 500	

AIM:

To create an Employee class that calculates and displays an employee's net salary based on their job category, with salary components and deductions, and demonstrates encapsulation and methods.

```
using System;
class Employee
{
```

```
public int EmpNo { get; set; }
  public string EmpName { get; set; }
  public int JobCategory { get; set; }
  public double BasicSalary { get; set; }
  public double HRA { get; set; }
  public double DA { get; set; }
  public double PF { get; set; }
  public double Loan { get; set; }
  public double NetSalary { get; set; }
  public Employee(double basicSalary, double hra, double da, double pf,
double loan)
  {
    BasicSalary = basicSalary;
     HRA = hra;
     DA = da;
    PF = pf;
     Loan = loan;
  }
  public void Input()
     Console.Write("Enter Employee Number: ");
     EmpNo = int.Parse(Console.ReadLine());
```

```
Console.Write("Enter Employee Name: ");
EmpName = Console.ReadLine();
Console.Write("Enter Job Category (1 or 2): ");
JobCategory = int.Parse(Console.ReadLine());
if (JobCategory == 1)
{
  BasicSalary = 8000;
  HRA = 0.1 * BasicSalary;
  DA = 0.2 * BasicSalary;
  PF = 500;
  Loan = 300;
}
else if (JobCategory == 2)
  BasicSalary = 15000;
  HRA = 0.2 * BasicSalary;
  DA = 0.3 * BasicSalary;
  PF = 1000;
  Loan = 600;
}
else
  Console.WriteLine("Invalid Job Category. Setting default to Table I.");
  BasicSalary = 8000;
```

```
HRA = 0.1 * BasicSalary;
    DA = 0.2 * BasicSalary;
    PF = 500;
    Loan = 300;
  }
}
public void CalculateSalary()
  NetSalary = BasicSalary + HRA + DA - PF - Loan;
}
public void Display()
{
  Console.WriteLine("\n--- Employee Details ---");
  Console.WriteLine($"Employee Number: {EmpNo}");
  Console.WriteLine($"Employee Name: {EmpName}");
  Console.WriteLine($"Job Category: {JobCategory}");
  Console.WriteLine($"Basic Salary: {BasicSalary}");
  Console.WriteLine($"HRA: {HRA}");
  Console.WriteLine($"DA: {DA}");
  Console.WriteLine($"PF: {PF}");
  Console.WriteLine($"Loan: {Loan}");
  Console.WriteLine($"Net Salary: {NetSalary}");
}
```

}

```
class Program
      static void Main(string[] args)
        {
             Employee employee = new Employee(0, 0, 0, 0, 0);
             employee.Input();
             employee.CalculateSalary();
                           employee.Display();
                                                                  Premium Coding
         Programiz
                                                                  Courses by Programiz
             1 using System;
                                                                                                                           Enter Employee Number: 4
Enter Employee Name: Nivetha
                                                                                                                           Enter Job Category (1 or 2): 2
          5
6 public int EmpNo { get; set; }
7 public string EmpName { get; set; }
8 public int JobCategory { get; set; }
9 public double BasicSalary { get; set; }
10 public double HRA { get; set; }
11 public double DA { get; set; }
12 public double PF { get; set; }
13 public double Loan { get; set; }
14 public double NetSalary { get; set; }
15
                                                                                                                            --- Employee Details ---
  5
                                                                                                                           Employee Number: 4
Employee Name: Nivetha
                                                                                                                           Job Category: 2
Basic Salary: 15000
  (
                                                                                                                           HRA: 3000
DA: 4500
                                                                                                                           PF: 1000
Loan: 600
                                                                                                                           Net Salary: 20900
                      // Constructor to initialize salary components public Employee(double basicSalary, double hra, double da, double pf, double loan)
                                                                                                                           === Code Execution Successful ===
                            HRA = hra;
DA = da;
PF = pf;
```

Enter Employee Number: 4

Enter Employee Name: Nivetha

Enter Job Category (1 or 2): 2

OUTPUT:

Employee Number: 4

Employee Name: Nivetha

Job Category: 2

Basic Salary: 15000

HRA: 3000

DA: 4500

PF: 1000

Loan: 600

Net Salary: 20900

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